

WHAT IS CLAIMED IS:

1. An apparatus for servicing an automobile fluid containing subsystem having a fluid reservoir with a subsystem pump and a subsystem inlet and a subsystem outlet, said apparatus comprising:

5 a manifold defining an exhaust port for coupling to said subsystem inlet, a return port for coupling to said subsystem outlet, a fresh fluid port, and a used fluid port;

a fluid transfer circuit at least partially formed within said manifold between said ports;

a drain/bypass valve having a fluid receiving inlet in communication with said return port and a multi-directional outlet, said drain/bypass valve being selectively operable to place said return port in fluid communication with either said exhaust port or said used fluid port;

10 a fresh fluid source coupled to said fresh fluid port;

a common pump coupled to said manifold and interposed between said new and used fluid ports and said exhaust port for pumping a fluid from either of said fluid ports to said exhaust port;

15 a dump/supply valve having a fluid expelling outlet in communication with said common pump and a multi-directional inlet, said dump/supply valve being selectively operable to place either of said used or new fluid ports in fluid communication with said exhaust port; and

20 whereby, said exhaust port may be coupled to said subsystem inlet and said return port may be coupled to said subsystem outlet, then said subsystem pump activated and said common pump selectively operated to direct at least one fluid through said fluid transfer circuit between ports as determined by the selective operation of at least one of said valves.

2. The apparatus as set forth in claim 1 wherein:

said fluid transfer circuit includes a drain path for directing fluid entering said return port to said used fluid port, a bypass path for directing fluid entering said return port to said exhaust port, a supply path for directing fluid entering said fresh fluid port to said exhaust port, and a  
5 dump path for directing fluid entering said used fluid port to said exhaust port.

3. The apparatus as set forth in claim 2 wherein:

said manifold is constructed to cause said drain and bypass paths to diverge at a point in said fluid transfer circuit downstream from said return port.

4. The apparatus as set forth in claim 2 wherein:

said manifold is constructed to cause said supply and dump paths to converge at a point in said fluid transfer circuit upstream of said exhaust port.

5. The apparatus as set forth in claim 3 wherein:

said drain/bypass valve is inserted into said fluid transfer circuit at said point of divergence and is selectively operable between a drain position and a bypass position.

6. The apparatus as set forth in claim 4 wherein:

said dump/supply valve is inserted into said fluid transfer circuit at said point of convergence and is selectively operable between a supply position and a dump position.

7. The apparatus as set forth in claim 2 wherein:

said paths are formed of adjacent linear segments within said manifold.

8. The apparatus as set forth in claim 1 wherein:

said manifold includes a suction port downstream of said fluid expelling outlet of said dump/supply valve and a pressure port upstream of said exhaust port in said fluid transfer circuit; and

5 said common pump includes a suction side coupled to said suction port via a suction hose and a pressure side coupled to said pressure port via a pressure hose.

9. The apparatus as set forth in claim 1 further including:

a used fluid receptacle coupled to said used fluid port.

10. The apparatus as set forth in claim 9 wherein:

said used fluid receptacle includes a used fluid sensor for providing a signal proportional to a used fluid level in said used fluid receptacle; and

5 said fresh fluid source includes a new fluid sensor for providing a signal proportional to a fresh fluid level in said fresh fluid source.

11. The apparatus as set forth in claim 1 further including:

a fluid transfer segment leading to said second port and including a pressure sensor in communication with said fluid transfer segment for sensing fluid pressure in said segment.

12. The apparatus as set forth in claim 1 further including:

a drain side filter connected to said manifold and interposed between said return port and said drain/bypass valve.

13. The apparatus as set forth in claim 1 further including:  
a supply side filter connected to said manifold and interposed between said pump and  
said exhaust port.

14. The apparatus as set forth in claim 1 further including:  
a first filter connected to said manifold and interposed between said return port and said  
drain/bypass valve; and  
a second filter connected to said manifold and interposed between said pump and said  
5 exhaust port.

15. The apparatus as set forth in claim 14 wherein:  
said first and second filters are connected to said manifold by first and second threaded,  
hollow, nipples.

16. The apparatus as set forth in claim 1 wherein:  
wherein said first and second valves are 2-position, 3-way solenoid valves.

17. The apparatus as set forth in claim 1 wherein:  
said manifold is constructed of a rigid material and said fluid transfer circuit is formed of  
passages with rigid walls.

18. A manifold assembly for use in conjunction with a fluid exchanger including a  
used fluid receptacle, a new fluid tank, said manifold assembly comprising:

a fluid circuit including a drain path for directing fluid entering a return port to a used

fluid port, a bypass path for directing fluid entering said return port to an exhaust port, a supply  
5 path for directing fluid entering a fresh fluid supply port to said exhaust port, and a dump path for  
directing fluid entering said used fluid port to said exhaust port, said supply and dump paths  
including a common passage wherein said used fluid port may be connected to said used fluid  
receptacle and said supply port may be connected to said new fluid tank;

10 a pump disposed inline with said common passage for pumping fluid through said supply  
and drain paths;

a valving component selectively operable to divert fluid entering said return port between  
said used fluid port and said exhaust port and to direct fluid from either said supply port or said  
drain port to said exhaust port; and

15 a rigid block body housing at least a portion of said fluid circuit and formed on its outer  
surface with said ports.

19. The manifold assembly as set forth in claim 18 further including:

a drain filter interposed in said fluid circuit between said return port and said valving  
component.

20. The manifold assembly as set forth in claim 18 further including:

a supply side filter interposed in said fluid circuit between said pump and said exhaust  
port.

21. The manifold assembly as set forth in claim 18 further including:

a drain filter interposed in said fluid circuit between said return port and said valving  
component; and

a supply side filter interposed in said fluid circuit between said pump and said exhaust

5 port.

22. The manifold assembly as set forth in claim 21 wherein:

each of said filters is threadably attached to said rigid block body via a threaded, hollow nipple.

23. The manifold assembly as set forth in claim 18 wherein:

said valving component includes first and second valves threadably coupled to said rigid block body with said first valve being selectively operable to divert fluid entering said return port between said used port and said exhaust port and said second valve being selectively operable to  
5 direct fluid from either said supply port or said drain port to said exhaust port.

24. The manifold assembly as set forth in claim 18 further including:

a pressure switch coupled to said rigid block body and disposed in fluid communication with said bypass path and responsive to fluid pressure therein.

25. The manifold assembly as set forth in claim 18 wherein:

said paths are formed of adjacent linear segments within said rigid block body.

26. The manifold assembly as set forth in claim 18 wherein:

said rigid block body is formed of aluminum.

27. The manifold assembly as set forth in claim 18 wherein:  
said rigid block body is formed of a transparent material.

28. The manifold assembly as set forth in claim 18 wherein:  
said rigid block body is formed of a polymeric material.

29. A manifold assembly for use in conjunction with a servicing apparatus having a used fluid receptacle, a fresh fluid source, and first and second hoses connected to an inlet and outlet of a vehicle subsystem having a fluid reservoir, said assembly comprising:

a rigid block body defining at least a portion of a fluid circuit between a return port  
5 constructed to be connected to said first hose, an exhaust port constructed to be connected to said second hose, a used fluid port constructed to be connected via a drain hose to said used fluid receptacle, and a fresh fluid supply port constructed to be connected via a supply hose to said fresh fluid source, a suction port, and a pressure port, said fluid circuit including a drain path between said return port said used fluid port, a bypass path between said return port and said  
10 exhaust port, a supply path between said fresh fluid supply port and said exhaust port, and a dump path between said used fluid port and said exhaust port, said supply and dump paths including a common passage;

a first valve threadably received in said body disposing said first valve in communication with said drain and bypass paths, said first valve being selectively operable to open and close  
15 said drain or bypass paths;

a second valve threadably received in said body disposing said second valve in communication with said supply and dump paths, said second valve being selectively operable to open and close said supply and dump paths; and

a pump inline with said common passage and having a first conduit coupled to said  
20 suction port and a second conduit coupled to said pressure port.

30. The manifold assembly as set forth in claim 29 wherein:

said hoses and said conduits may be pressed into their respective said ports and releasably retained thereto.

31. A manifold assembly for use in conjunction with a servicing apparatus including a used fluid receptacle, a fresh fluid source, a pump, an inlet servicing hose, and an outlet servicing hose, said assembly comprising:

a fluid circuit defining means including a rigid block manifold having a return port for  
5 coupling to said inlet servicing hose, an exhaust port for coupling to said outlet servicing hose, a fresh fluid port for coupling to said fresh fluid source, a used fluid port for coupling to said used fluid receptacle, and a fluid transfer circuit at least partially formed within said manifold between said ports;

a first flow diverting means for selectively diverting fluid entering said return port to  
10 either said exhaust port or said used fluid port;

a second flow diverting means for selectively diverting fluid from said used fluid port or said fresh fluid port to said exhaust port; and

a pumping means interposed between said fluid ports and said exhaust port for pumping a fluid from either of said fluid ports to said exhaust port.



32. A manifold assembly for use in conjunction with a fluid servicing apparatus having used and new fluid tanks and a pair of service hoses comprising:

a manifold body defining first and second pathways for fluid transfer therethrough and further defining at least one filter receiving aperture and at least one valve receiving aperture;

5 a return port on said manifold body adapted to be coupled to an end of one of said service hoses;

an exhaust port on said manifold body adapted to be coupled to an end of an other of said service hoses;

10 a used fluid port on said manifold body in fluid communication with said return port via said first pathway and adapted to be coupled to said used fluid tank;

a new fluid port on said manifold body in fluid communication with said exhaust port via said second pathway and adapted to be coupled to said new fluid tank;

a filter coupled to said manifold in said filter receiving aperture to filter fluid passing through at least one of said pathways; and

15 a valve coupled to said manifold in said valve receiving aperture and selectively operable to divert fluid between pathways.

33. A method of assembling a manifold apparatus for use in conjunction with a servicing apparatus including a cabinet carrying a used fluid receptacle, a fresh fluid source, a pumping device, and including an outlet hose and an inlet hose, said method comprising:

5 providing a rigid manifold body including at least one filter port, at least one valve port, an in-hose port, an out-hose port, a used fluid port, and a new fluid port, a suction port and a pressure port, said body including a plurality of passages constructed to place each of said ports in fluid communication with at least one other of said ports, when in use;

coupling a filter to said filter port;  
coupling a first valve to said first valve port;  
10 mounting said body to said cabinet;  
coupling said in-hose port to said inlet hose;  
coupling said out-hose port to said outlet hose;  
coupling said used fluid port to said used fluid receptacle;  
coupling said new fluid port to said fresh fluid source; and  
15 coupling said pump to said suction and pressure ports.

34. The method as set forth in claim 33 further comprising:  
providing at least one conduit having a first end for coupling a port to a hose, receptacle,  
or source and having a second free end;  
pressing said free end into a selected port to releasably retain said free end thereto.